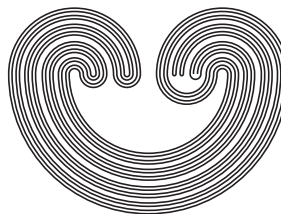


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DEPICTING A GENERALIZED SHIFT MOVE IN CROWN DIAGRAMS

by

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DEPICTING A GENERALIZED SHIFT MOVE IN CROWN DIAGRAMS

JONATHAN D. WILLIAMS

ABSTRACT. We give a diagrammatic way to perform a generalized shift move on a crown diagram of a smooth 4-manifold. Applications include a simplified proof that if two crown diagrams are related by a generalized shift move, then they are slide-equivalent; a method for converting a genus $g > 1$ Lefschetz fibration into a crown diagram; and a proof that the vanishing cycles of such a crown diagram are slide-equivalent to a standard inclusion of the Lefschetz vanishing cycles into a genus $g + 1$ surface.

1. INTRODUCTION

The study of the interplay between critical points of smooth mappings, the topology of their domains, and the diagrams that record them is a classical one which continues to yield interesting results, for example the relation between Lefschetz fibrations and trisections in [3]. This paper adds the corresponding result for a closely related object, called a crown diagram, by depicting how a rather local creation and cancellation homotopy involving the well-known critical points called indefinite cusps can change the global fibration structure of a smooth 4-manifold as recorded in a crown diagram. The *maps* in this paper have a lot of names, such as “excellent maps” [8], “Morse 2-functions” [4], and “purely wrinkled fibrations” [7]. Suffice it to say that in this short introduction they are maps from a smooth 4-manifold to a smooth 2-manifold whose singular sets consist of indefinite cusps and indefinite folds. In this paper, we use

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